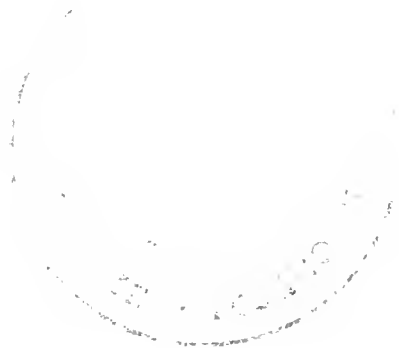


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The Influence of Boundary Spanning Supervision
On The Turnover and Promotion of RD&E Professionals

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ABSTRACT

This research investigates the influence of boundary spanning project supervisors on the turnover and promotion of engineering professionals in an RD&E facility. Using data collected at two points over a five year period, we found that the assignment of young engineers to work for project supervisors who were also functioning as technical gatekeepers significantly affected the organizational careers of these engineers, decreasing the probability of turnover and increasing the probability of promotion to management. Gatekeepers serve an important socialization function in RD&E over and above their information acquisition role. More generally, the results indicate that supervisory behavior directly affects early work experiences which, in turn, dramatically affect long-term career outcomes.

What factors influence turnover and promotion in RD&E settings? One research stream has looked at the effects of job experiences and formal supervision (e.g., Berlew and Hall, 1966); other studies have looked at the norms and climate created in the laboratory (e.g., Pelz and Andrews, 1966;) while still others have looked at the effects of communications and boundary spanning roles (e.g., Allen, 1977). In RD&E settings, boundary spanning individuals are key actors in the laboratory's communication and information processing activities (Katz and Tushman, 1979). The present study investigates (over a five year period) the influence of boundary spanning supervisors on the turnover and promotions of their project subordinates. Underlying our study is the basic idea that career decisions are strongly affected by how well individuals are linked into their organization's formal and informal networks (Graen and Ginsburgh, 1977).

Literature Review and Hypotheses

Although RD&E groups must acquire outside information to keep informed about new technical advances, research has shown that direct contact by all engineering project members is not an effective method for communicating outside the project group. Instead, boundary spanning project members are needed to effectively link project teams to outside sources. As discussed by Allen and Cohen (1969), special project members, labelled gatekeepers, are needed to link project colleagues to key sources of information both inside and outside the organization. Other project members, labelled internal liaisons, link project colleagues only to sources of information within the organization. Information is transmitted effectively into project groups through both types of individuals (Tushman, 1977). First, gatekeepers and internal liaisons gather and understand relevant outside

information; and subsequently, they channel it in more meaningful terms to their project colleagues. As a result, boundary spanning individuals are the principal means by which outside ideas and information are transferred effectively into RD&E project groups (Katz and Tushman, 1981; Allen, 1977). Although gatekeepers and internal liaisons connect project colleagues to important information sources within the organization, only gatekeepers provide an effective interface with technical knowledge outside the organization (Tushman and Scanlan, 1981).

Most boundary spanning individuals in RD&E are also project supervisors. Project supervisors who are seen as technically competent, who keep current, and who are seen as valuable sources of ideas and information become boundary spanning individuals simply because they are consulted and listened to more frequently. Previous research, in fact, has shown that between 70 and 80 percent of the boundary spanning individuals are also first level project supervisors; whereas, only about half of the project supervisors perform a boundary spanning function (Tushman and Scanlan, 1981; Allen, 1977). Even though boundary spanning has been recognized as one of the more important elements of effective leadership and managerial behavior (e.g., Likert, 1967; Mintzberg, 1973), we still know very little about how boundary spanning activity affects the work activities and careers of those project members reporting to them?

Boundary Spanning Supervision, Turnover, and Promotion to Management

Research over the past 15 years has demonstrated that interpersonal communications are the primary means by which engineering professionals acquire and disseminate important ideas and information (Menzel, 1966; Allen, 1977). Moreover, it is through such social processes that most

professionals come to learn the norms, values, and operating rules of their organization (Katz, 1980; Kerr, 1977). It seems that most RD&E professionals keep abreast of new technical developments and organizational demands through informal contact and personal associations with other RD&E professionals.

If interpersonal contact and interaction are key determinants of integration and socialization in RD&E and if boundary spanning supervisors are critical players in the laboratory's communication and information processing network, then these supervisors are doing more than simply channeling outside information into their groups. Most likely, they are assuming a broader training, integration, and socialization role within their work groups. As a result of their elaborate outside contact and close working relationships with project subordinates, boundary spanning supervisors not only improve their group's technical performance (Tushman and Katz, 1980), but they may also affect the personal growth and development of project members. To the extent that boundary spanning supervisors help project members communicate and contribute more effectively within their work settings, project members will be less likely to leave the organization (Graen and Ginsburgh, 1977; Farris, 1971). Engineers assigned to work with these boundary spanning supervisors, then, have better chances at gaining increased exposure and more extensive work opportunities and consequently should have a greater rate of promotion. Based on these

arguments, the following are hypothesized:

1. Project members working for boundary spanning supervisors are more likely to remain with the organization than project members working for supervisors who are not boundary spanners.
2. Project members working for boundary spanning supervisors are more likely to receive promotions to management than project members working for supervisors who are not boundary spanners.

Although, these turnover and promotion effects are proposed for project members in general, young employees are more likely to benefit from the socialization and developmental role played by boundary spanning supervisors (Berlew and Hall, 1966). Since most turnover occurs within the first few years of organizational employment (Schein, 1978) and since engineers usually expect promotions to managerial rank sometime between the ages of 30 and 40 (Dalton, Thompson and Price, 1982; Ritti, 1971), the proposed relationships should be even stronger for younger project members. Accordingly, the hypotheses will be tested for the full sample of professionals and for project members of different age groups.

Alternative comparisons. To what extent are promotions simply a function of working for supervisors who are themselves promoted to higher managerial positions? Webber (1976) suggested that working for highly promotable supervisors enhances the likelihood that one will also receive a promotion. Boundary spanning supervisors are usually promoted (Allen, 1977; Katz and Tushman, 1981), but they comprise only a subset of supervisors who receive promotions over a given time frame. As a result, we will investigate whether there is a particular benefit in working for boundary spanning supervisors over working for any project supervisor who gets promoted. Furthermore, it is possible that being assigned to a high performing project group affects the turnover and promotion opportunities of young project members more than the technical and interpersonal skills of

their boundary spanning supervisors. The hypothesized relationships, therefore, will also be tested and compared against the effects of working in high-performing project teams.

Methodology

Setting

This study was conducted among all project members working in a large corporate RD&E facility. At the start of our study, the facility's professionals (N = 325) were divided into 61 projects organized around specific, long-term types of discipline and product focused problems. Each professional was a member of only one project group.

Five years after the initial data collection period, we returned to ascertain the titles and positions of those professionals still employed by the organization. Although the RD&E facility nearly doubled in size during this interval, our longitudinal examinations will only focus on the career histories of those professionals employed at the start of our study. In addition, eight percent of the project members retired during the five year period and consequently were excluded from all analytical investigations.

Communications, Gatekeepers, and Internal Liaisons

To measure communication activity, project members reported (on specially provided lists) those individuals with whom they had work-related oral communication on a randomly chosen day each week for 15 weeks. Social and written communications were not reported. During the 15 weeks, the overall response rate was 93 percent. As discussed by Katz and Tushman (1979), these procedures provided a very clear, accurate picture of each project member's communication patterns.

For each project member, six mutually exclusive communication measures were operationalized as follows:

1. Departmental Communication: The amount of communication with other non-supervisory engineering colleagues within his or her functional department including project colleagues.
2. Laboratory Communication: The amount of communication with other engineering colleagues within the remaining six functional departments.
3. Immediate Supervisory Communication: The amount of communication with his or her immediate project supervisor.
4. Departmental Supervisory Communication: The amount of communication with his or her departmental supervisor.
5. Corporate Communication: The amount of communication with other individuals outside the RD&E facility but within other corporate divisions, primarily marketing and manufacturing.
6. External Professional Communication: The amount of communication with other RD&E professionals outside the parent organization, including professionals within universities, consulting firms, and various professional societies.

For each project engineer, the amount of communication to these two horizontal, two vertical, and two outside sources of information were calculated by summing the number of interactions reported during the 15 weeks (see Katz and Tushman, 1979 for details). These six measures of communication were not strongly associated with one another.

Conceptually, gatekeepers are defined as those project members who are very high internal communicators and who also maintain very high external contacts with outside professionals. This study operationalized gatekeepers as those project members whose departmental and external professional communications were both in the top fifth of their respective distributions (Katz and Tushman, 1981; Whitley and Frost, 1973). Internal liaisons, on

the other hand, were defined as those project members who were in the top fifth of both their departmental communication distribution and of their communications to other functional departments and organizational divisions (Allen and Cohen, 1969; Tushman and Scanlan, 1981). Based on these definitions, 18 percent (n=11) of the project supervisors functioned only as internal liaisons, 13 percent (n=8) functioned only as gatekeeping supervisors, and 11.5 percent (n=7) fulfilled both the gatekeeping and internal liaison roles. The remaining project supervisors (n=35) were not performing a boundary spanning function either as a gatekeeper or as an internal liaison.

Project Performance

To get comparable measures of project performance, all laboratory managers (N = 9) were asked to evaluate the overall technical performance of all projects with which they were sufficiently familiar. Each project was independently evaluated by an average of five managers using a seven-point Likert type scale ranging from (1) very low to (7) very high. Individual ratings were averaged to yield overall project performance scores (Spearman-Brown reliability = .81). To classify project members according to whether they were working in a high or low performing project team, project groups were split at the sample mean of 4.59.

Promotion and Turnover

Almost five years after the collection of the preceding data, we returned to gather data on managerial promotions and turnover. Despite the facility's strong growth, 31 percent of the project members and 19 percent of the project supervisors had left the company during this time interval.

Furthermore, among the 15 gatekeepers and 18 internal liaison supervisors, the turnover rates were 20 and 17 percent, respectively.

In this organization, managerial positions and titles start within the department above the project supervisory level. During the five year interim period, 11 percent of the project members and 46.5 percent of the project supervisors had been promoted to management positions. Although less than half of the project supervisors had received management promotions, 73.3 percent of the gatekeeping subset and 67 percent of the internal liaison subset had been promoted to management levels.

Results

Turnover

To test the first hypothesis regarding the influence of boundary spanning supervisors on the turnover rates of project engineers, we examined the percentages of project members who remained with the organization over the 5-year period as a function of their prior type of supervision. For the sample as a whole, project engineers who reported to gatekeeping supervisors had a significantly lower rate of organizational turnover (only 16%) than engineers assigned to supervisors who were either non-boundary spanners or only internal liaisons (30% and 38% respectively). Clearly, gatekeepers had a more positive effect on reducing turnover rates than internal liaisons. Furthermore, project members assigned to those supervisors who received promotions did not stay with the organization any longer than members who worked for unpromoted supervisors. Similarly, engineers who worked in high performing projects did not remain with the organization any longer than those who worked in low performing projects.

Since 70 percent of the turnover occurred for project members less than 36 years of age, additional comparisons were carried out for separate age

groupings. Except for gatekeeping supervisors, these additional comparisons failed to uncover any significant turnover differences between prior types of reporting relationships or between high and low project performance. To pinpoint the influence of gatekeepers on subordinate turnover, Figure 1 plots as a function of age the cumulative retention rates of project members reporting to gatekeeping supervisors (Group A) and those members not reporting to gatekeeping supervisors (Group B).

Insert Figure 1 About Here

Of those project subordinates who were 25 years or less, only 33 percent remained in the organization if they had not reported to a gatekeeping supervisor. The comparable percentage for project members assigned to a gatekeeping supervisor was almost 80 percent. Similarly, of those project subordinates who were 35 years old or less, only 57 percent remained with the organization if they had not been working with a gatekeeping supervisor. The comparable percentage for those with gatekeeping supervisors was 84 percent. Although this difference is statistically significant, the figure clearly shows that most of the difference in retention rates between Groups A and B occurs among members between the ages of 25 and 29. Retention rates between the two groups converge rather quickly after age 35.

Clearly, gatekeeping supervisors had considerable influence over the turnover rates of young professionals within this facility. What is it about gatekeeping supervisors that brings about these lower levels of turnover? As previously discussed, turnover may be a function of how well young professionals get integrated into their organization's formal and informal networks. To investigate whether young project members reporting

to gatekeeping supervisors had different interaction patterns than project members reporting to non-gatekeeping supervisors, Table 1 reports mean communication scores broken down by supervisory relationships and turnover. Separate comparisons are reported for communication to each of the six information sources defined in the Methods Section.

Insert Table 1 About Here

As shown in Table 1, project members who either stayed or left did not differ in the intensity of their prior horizontal collegial interactions or in their contacts with individuals and professionals outside the RD&E facility. What differentiated young stayers from leavers was their level of contact with their project and departmental supervisors; that is, their degree of vertical communication and integration. For both gatekeeping and non-gatekeeping relationships, project subordinates who remained over the five years had significantly more communication with their departmental supervisor than project members who left. Stayers also had more interaction with their project supervisors, although the difference was not quite significant for members who reported to non-gatekeeping project supervisors. Thus, it may not be the assignment of young project members to a gatekeeping supervisor per se that enhances long-term retention. What really made the difference was the high level of vertical interaction that took place between gatekeeping supervisors and their young engineering subordinates.

Managerial Promotion

During the five years, 23 of the project members were promoted to managerial positions. As with turnover, project members who reported to gatekeeping supervisors had a significantly higher rate of promotion (14.7%) than project members who reported either to non-boundary spanning supervisors (11.1%) or to internal liaisons (11.3%). Furthermore, individuals assigned to supervisors who were subsequently promoted were no more likely to get promoted than individuals who worked for unpromoted supervisors. Similarly, individuals from high performing projects did not receive proportionately more promotions than individuals from low performing projects.

Since almost 70 percent of the project members promoted to managerial positions were between the ages of 27 and 32 at the start of our study, we reanalyzed the data within this more limited age range. As before, the various types of reporting relationships revealed no important effects on promotion rates within this restricted subsample, except for the comparison of gatekeeping versus non-gatekeeping supervisors. For this comparison, the difference was significant; for project members who reported to a gatekeeping supervisor, the promotion rate was 41.2 percent, whereas only 17.4 percent of the engineers who reported to a non-gatekeeping supervisor were similarly promoted.

Although proportionately more engineers who had reported to gatekeepers were promoted to management within this general subsample, we also discovered that most of this difference can be found in the area of product and process development as opposed to basic research or technical support kinds of engineering activities. Over two-thirds of the engineers reporting to gatekeepers in development projects received management promotions in

contrast to only 18.5 percent of the engineers reporting to non-gatekeepers. Interestingly, development work is precisely the project area in which gatekeepers are presumably most necessary and influential (Katz and Tushman, 1981) and consequently where they seem to have the strongest influence over managerial promotions.

As in the turnover analyses, we examined the communication patterns of project members within these more limited subsamples to see if those promoted also had differential patterns of contacts and interactions within their work settings. None of the communication measures, however, was significantly related to managerial promotions for these individuals.

Discussion

The research findings presented here support the idea that supervisory behavior is an important factor in the making of one's organizational and professional career. Not all supervisors in our study, however, had comparable relationships with the career outcomes of their engineering subordinates. Only boundary spanning gatekeeping supervisors were significantly associated with reduced turnover rates and higher rates of subordinate promotion to management. These associations, moreover, were particularly strong for young professionals; disappearing for older, more experienced engineers.

Why were these gatekeepers so strongly related to lower levels of turnover? Was it the result of their supervisory status, their technical ability, or their outside professional contacts? While these characteristics are certainly important, our results on communication suggest that gatekeepers were related to the low turnover among their young project subordinates because of the high levels of hierarchical interaction

and activity that took place between them. Since gatekeeping supervisors are technically competent, interpersonally active, and readily identify with the professional orientations of young engineers, they establish close working relationships with most of their project subordinates, almost 85% in our study. It was this high level of hierarchical activity and concern that discriminated between young engineers who stayed and those who left. In the relatively few cases in which gatekeeping supervisors either failed to communicate or denied access to their young subordinates, these individuals probably became disenchanted, gave up, and left. Thus, it may not be the gatekeeping role or supervisory status per se that is related to turnover. In line with the findings of Graen and Ginsburgh (1977), what seems most beneficial are high levels of work-related contact and involvement with relevant competent supervisors -- interactions that occur most frequently with gatekeeping supervisors.

In addition to these turnover relationships, gatekeeping supervisors were also linked to the managerial promotions of project subordinates who were between the ages of 27 and 32 at the start of our study. Within this age range, project members working for gatekeeping supervisors attained a significantly higher rate of promotion to management than project members working for non-gatekeeping supervisors. Furthermore, the promotion rate for young project members reporting to gatekeepers in development areas was more than three times the promotion rate of development project members assigned to non-gatekeeping supervisors. In development work, gatekeepers are highly influential individuals who strongly enhance project performance by connecting engineers to more useful ideas and information outside the project. Having better access to critical information along with working for influential supervisors may be associated with greater work

opportunities and organizational visibility which, in turn, lead to higher rates of management promotion.

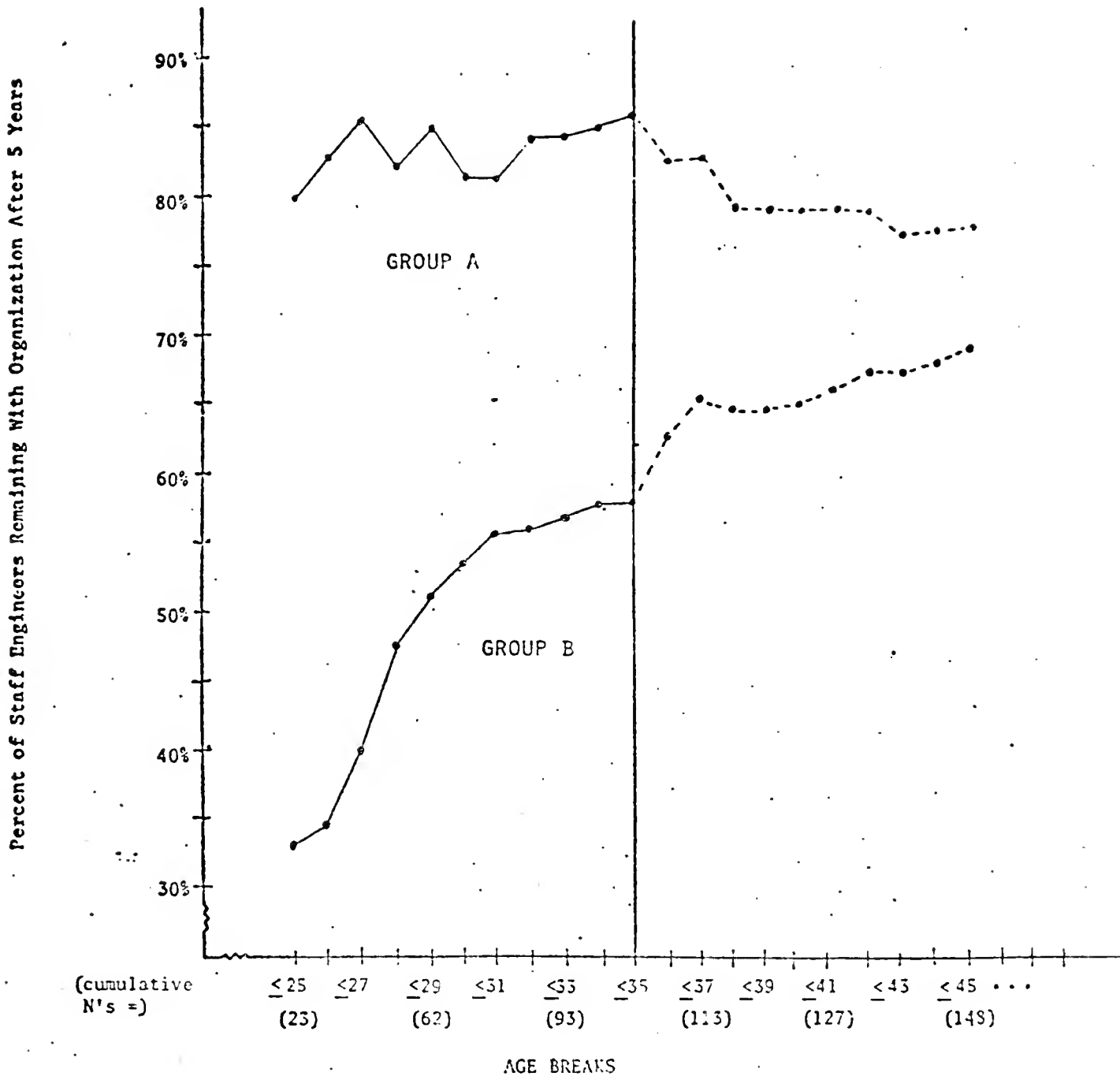
From a broader perspective, the relationship between lower turnover and high interpersonal involvement with gatekeeping supervisors affirms the important role that project supervisors can and should play during the early socialization years of young professionals. As discussed by Schein (1978) and Katz (1980), young employees build perceptions of their work environment and establish their new organizational identities through the plethora of interactions and interpersonal activities take place during the early years of their laboratory integration. Young engineers, therefore, not only need to interact with their colleagues and peers, but they also require considerable interaction with and feedback from relevant supervisors to learn what is expected of them and to decipher how to be a high performing contributor.

Because they are well-connected professionally and organizationally, gatekeepers are particularly qualified to meet the breaking-in concerns of young professionals, directing and coupling the professional orientations of young engineers with a more appropriate organizational focus. Most likely, the high level of interpersonal contact between gatekeeping supervisors and young project engineers not only facilitates socialization but also results in more accurate expectations, perceptions, and understanding about one's role in the project and in the larger organization -- all of which are important in decreasing the turnover of newcomers (Wanous, 1980; Pondy, 1978). Although socialization can take place in many different ways, gatekeeping supervisors appear particularly important in the organizational integration of young engineering subordinates, helping them understand and interpret the reality of their new settings in order to

function more fully and meaningfully within the organization.

Finally, one should realize that in a longitudinal field study of this sort, the random assignment of project members to gatekeeping and non-gatekeeping supervisors was not possible. Although our thinking emphasizes the direct role that gatekeepers might play in influencing project members' careers, it is also possible that gatekeepers either attracted or were assigned members who were more likely to stay or were of higher promotion potential. Furthermore, other uncontrolled organizational factors could have influenced our results. What we do know is that project members who reported to gatekeeping supervisors early in their careers had more successful organizational outcomes. It remains for future research to look even more closely at these kinds of relationships. Even with these traditional caveats, substantial research and practice strongly indicates that gatekeepers are extremely important in RD&E settings not only for the effective transfer and processing of outside technical information but also in the socialization and development of young engineers.

Figure 1. Retention of Engineers After 5 Years By Prior Type of Reporting Relationships at Successive Age Breaks



LEGEND

Group A: Staff engineers who reported directly to a gatekeeping supervisor.

Group B: Staff engineers who reported directly to a non-gatekeeping supervisor.

Note: a) The vertical line indicates that pairwise percentages between Groups A and B remained significantly different ($p < .05$) through an age break of 35 years.

b) N's represent the total number of engineers within both Groups at six representative age breaks.

Table 1 Mean Communications of Young Engineers (< 30 years) Broken Down by Prior Reporting Relationship and Subsequent Turnover

-----Prior Reporting Relationship-----

Prior Measures of Communication (per month)	Assigned to a Gatekeeping Supervisor	Not Assigned to a Gatekeeping Supervisor
<u>Horizontal Communications With:</u>		
1. Departmental Colleagues		
a. Engineers Who Remained	117.8	104.8
b. Engineers Who Left	110.2	113.4
2. Laboratory Colleagues		
a. Engineers Who Remained	28.2	26.3
b. Engineers Who Left	27.1	24.8
<u>Vertical Communications With:</u>		
3. Immediate Supervisor		
a. Engineers Who Remained	30.1 ^a	27.6
b. Engineers Who Left	8.8 ^b	19.0
4. Departmental Supervisor		
a. Engineers Who Remained	4.9 ^a	3.6 ^a
b. Engineers Who Left	0.0 ^b	1.2 ^b
<u>Outside Communications With:</u>		
5. Other Corporate Areas		
a. Engineers Who Remained	17.9	20.8
b. Engineers Who Left	25.8	17.4
6. External Professionals		
a. Engineers Who Remained	1.1	2.1
b. Engineers Who Left	5.8	2.0

Note: For each pair, communication means superscripted "a" are significantly greater than those superscripted "b" (p < .05). N's can be found in Table 2.

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